

CLAIMS

1. A method of measuring polarization mode dispersion of an optical fiber, comprising:
 - 5 inputting linearly polarized pulse light into the optical fiber;
 - separating the input linearly polarized light from backscattered light from the optical fiber;
 - detecting a light intensity of the backscattered light as time series data since the generation of the pulse light;
 - 10 calculating a fluctuation of the detected light intensity; and
 - evaluating polarization mode dispersion of the optical fiber based on the calculated fluctuation value.
2. A method of measuring polarization mode dispersion of an optical fiber, comprising:
 - 15 inputting linearly polarized pulse light into the optical fiber;
 - separating the input linearly polarized light from backscattered light from the optical fiber, the plane of polarization of the input linearly polarized light being the same as the plane of polarization of the backscattered light;
 - detecting a light intensity of the backscattered light as time series data since the
 - 20 generation of the pulse light;
 - calculating a fluctuation of the detected light intensity; and
 - evaluating polarization mode dispersion of the optical fiber based on the calculated fluctuation value.
- 25 3. The method of measuring polarization mode dispersion in an optical fiber, according

to claim 1 or 2, wherein:

a first fluctuation of light intensity is calculated by inputting linearly polarized pulse light into a first end of the optical fiber and detecting time series data of the light intensity of the backscattered light through the first end of the fiber;

5 a second fluctuation of light intensity is calculated by inputting linearly polarized pulse light into a second end of the optical fiber and detecting time series data of the light intensity of the backscattered light through the second end of the fiber; and

polarization mode dispersion in the optical fiber is evaluated based on an average value of the first fluctuation and the second fluctuation.

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4. The method of measuring polarization mode dispersion in an optical fiber according to claim 1 or 2, further comprising:

evaluating polarization mode dispersion in a predetermined section of the optical fiber by comparing fluctuation of the light intensity measured in the predetermined

15 section of the optical fiber with fluctuation of the light intensity measured using the same method in an optical fiber whose polarization mode dispersion is already known.

5. The method of measuring polarization mode dispersion in an optical fiber according to claim 1 or 2, further comprising:

20 evaluating a longitudinal distribution of polarization mode dispersion of the optical fiber by comparing a fluctuation in the optical intensity measured in each of a plurality of sections in the longitudinal direction of the optical fiber with fluctuation of the light intensity measured using the same method in an optical fiber whose polarization mode dispersion is already known.

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6. The method of measuring polarization mode dispersion in an optical fiber according to claim 1 or 2, wherein the fluctuation of the light intensity is calculated as fluctuation in a regression residual error using the least-square method.

5 7. The method of measuring polarization mode dispersion in an optical fiber according to claim 1 or 2, wherein a scale of the fluctuation of the light intensity is standard deviation.

8. The method of measuring polarization mode dispersion in an optical fiber according
10 to claim 1 or 2, wherein a scale of the fluctuation of the light intensity is a difference between a maximum value and a minimum value.

9. An apparatus for carrying out the method of measuring polarization mode dispersion in an optical fiber according to claim 1 or 2, comprising:

15 a pulse generating device;

an optical circulator that inputs pulse light generated by the pulse light generating device into an end of the optical fiber, and that outputs backscattered light that has returned through the end of the optical fiber;

a photodetector that detects a light intensity of the backscattered light output from
20 the optical circulator as time series since the generation of the pulse light;

an analyzer that analyzes polarization mode dispersion in the optical fiber based on the light intensity of the backscattered light output from the photo detector; and

at least one polarizer that linearly polarizes incident light input into the optical fiber and backscattered light output from the optical fiber .

10. The apparatus for measuring polarization mode dispersion in an optical fiber according to claim 9, wherein the at least one polarizer polarizes the incited light input into the optical fiber and the output light output from the optical fiber into linearly polarized light of the same plane of polarization.

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11. The apparatus for measuring polarization mode dispersion in an optical fiber according to claim 9, wherein the at least one polarizer is a polarization-beam-combiner-type coupler.

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12. An apparatus for carrying out the method of measuring polarization mode dispersion in an optical fiber according to claim 1 or 2, comprising:

an OTDR apparatus; and

a polarizer that polarizes both incident light input into the optical fiber and output light output from the optical fiber into linear polarized light of the same plane of polarization.

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13. The apparatus for measuring polarization mode dispersion in an optical fiber according to claim 12, wherein an optical amplifier is provided between the commercialized OTDR apparatus and the polarizer.

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